Agriculture, Food and
Nutrition Sciences

Agricultural Economics Program

ional Development Research Centre

Il existe également une version française de cette publication.

La edición española de esta publicación tambien se encuentra disponible.

Agricultural Economics Program

Foreword

This booklet is intended to familiarize researchers and research-funding agencies with the scope of research supported by the Agriculture, Food and Nutrition Sciences Division of the International Development Research Centre (IDRC). It also provides information on how IDRC works with scientists in identifying research priorities and on the kind of support provided to researchers for developing and executing projects in the field of agricultural economics research.

In recent years, agricultural research has become increasingly international in scope, often with the participation of numerous institutions from several countries, each contributing its own particular expertise. At the same time, Canadian universities and research organizations have become increasingly interested in the agricultural problems of developing countries. As a result, these Canadian groups have strengthened the scientific capabilities needed to participate in the research efforts that are critical to ensuring sustainable agriculture and an equitable distribution of its products. We hope that this booklet will help to explain IDRC's role as a research-funding agency in this increasingly interconnected agricultural research environment.

The production of this booklet was a team effort by various IDRC staff members. The assistance of two people, in particular, is gratefully acknowledged: Gordon Banta, Associate Director responsible for IDRC's Agricultural Economics Program, and Liliana Wagner, Executive Scientific Assistant for the Division who coordinated the writing of this series, which includes four other booklets.

Hubert G. Zandstra
Director
Agriculture, Food and Nutrition Sciences Division
International Development Research Centre

The International Development Research Centre

The mission of the International Development Research Centre (IDRC) is to contribute to development through research and research-supporting activities. The Centre aims to assist in promoting the indigenously determined social and economic advancement of the developing regions of the world, with particular focus on the poorest people of those regions.

Within this mission, IDRC has two principal objectives: first, to support research of direct relevance to Third World development and having direct, demonstrable links to the basic needs of the poor; and, second, to assist developing countries to build indigenous research and research-supporting capacity, mainly at the national, but also at the regional, level and mainly in terms of human resources.

IDRC aims at these objectives by focusing its activities in six main areas: agriculture, food, and nutrition sciences; communications; earth and engineering sciences; health sciences; information sciences; and social sciences. IDRC also funds training in all these areas.

The Agriculture, Food and Nutrition Sciences Division

The world food situation is generally more positive than it was a decade ago. Food production is increasing at about 2.6% per year, slightly faster than the growth of the population but still below the increase in demand for food. More importantly, however, a considerable proportion of the world's population continues to receive much less than the minimal nutritional requirements. Technological innovation in food production has largely been concentrated in East Asia. Recent efforts to duplicate this achievement in Africa have been less successful because many of the prerequisites for success are not yet present there.

The Agriculture, Food and Nutrition Sciences (AFNS) Division's mission within the Centre is to contribute to agricultural development through specific research and research-supporting activities designed to make adequate food available to the individual and to improve the production, protection, preservation, processing, distribution, marketing, and utilization of agricultual commodities of plant and animal origin from land- or water-based systems, including forests. The scope includes the transformation of these commodities and the development of related industrial technologies to generate employment and income to enable people to purchase food. It also includes improving the use of land resources and protecting natural resources for future agricultural production.

The Division gives high priority to dissemination of research results and training of research staff in developing countries. On average, 2–5% of the project funds are now allocated to publications and dissemination workshops. Most AFNS projects contain a specific training component, which averages 10% of the project budget.

The Division's strategy is to support indigenous applied research carried out in close association with rural households, which make up 70% of the people in developing countries and who are to use and benefit from the research. Because effective research requires international linkages for evaluating germ plasm, exchanging information, training, and developing technology, AFNS also supports more advanced research in international and regional research centres, as long as such work is directly relevant and complementary to specific research projects or networks with national programs. Similarly, when Canadian institutions offer relevant expertise, the Division funds cooperative projects that are undertaken jointly by Third World and Canadian scientists.

AFNS supports research projects through five programs: Agricultural Economics, Crop and Animal Production Systems, Fisheries, Forestry, and Post-Production Systems. This booklet reviews recent activities and outlines the future directions of the Agricultural Economics Program. Brief reviews of the other four AFNS programs begin on page 15.

The Agricultural Economics Program

Introduction

The Agricultural Economics Program within AFNS is concerned with the production, distribution, and consumption systems for food as they affect rural households in developing countries.

The priorities and projects undertaken by the Program are influenced by the needs and priorities of developing countries, the areas of focus of other programs within AFNS as well as within other divisions of IDRC, and the plans and actions of other donors. The Program often participates in joint, parallel, and sequential projects with other programs within AFNS and other IDRC divisions to support an agricultural economics component that meets the Program's objectives. Linkages with national and international centres are planned in the development of the subprograms of the Agricultural Economics Program.

Program Objectives

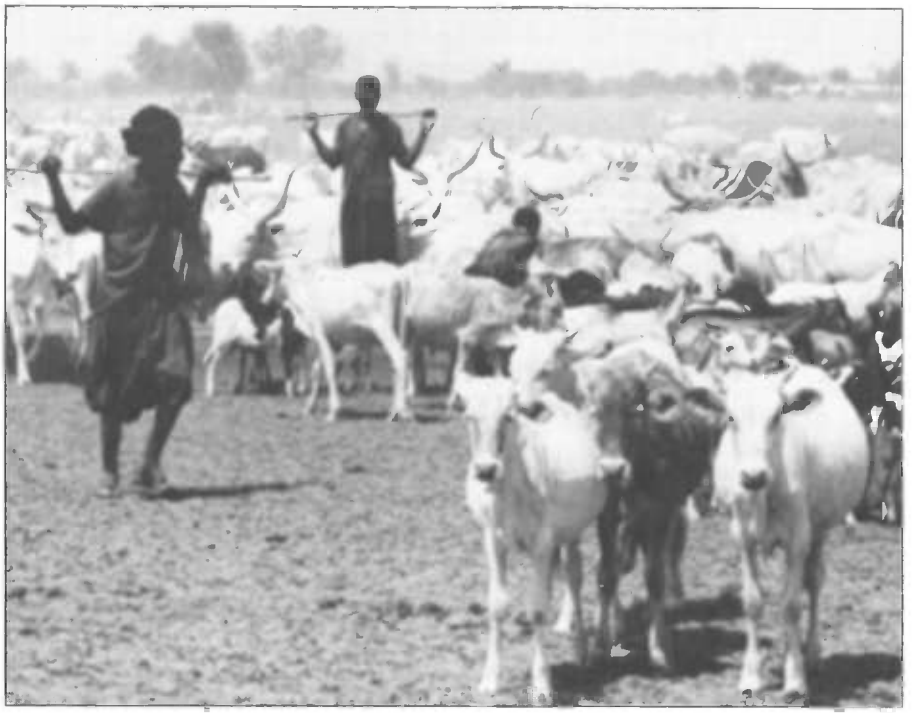
The objects of the Agriculture Economics Program are threefold:

- To support agricultural research and development activities that strengthen the capacity of rural households and communities to meet their development goals;
- To increase the efficiency with which agricultural scientists and their institutes conduct research to meet the needs of rural communities; and
- To initiate and collaborate in new research relevant to the needs of the rural community.

Within these broad objectives, three areas, or subprograms, have been identified for specific support: natural resource production and utilization systems, technology introduction, and resource allocation in agricultural research.

Natural Resource Production and Utilization Systems

The goal of the Natural Resource Production and Utilization Systems (NRPUS) subprogram is to include socioeconomic criteria in the decision-making processes for research on systems for natural resource production and utilization. The subprogram is concerned with integrating socioeconomics into the design, testing, and evaluation of new technology in systems based on crops, animals, fish, and forestry, and on post-harvest based systems.



Support is provided for two major research approaches. The first and largest integrates socioeconomic activities into interdisciplinary research projects that will be primarily collaborative with other subprograms in AFNS. However, collaboration with natural scientists in national programs, other divisions of IDRC, and other agencies are welcome. The second approach focuses on supporting social scientists to increase their capabilities to contribute to the research process. This includes socioeconomic research to provide the basic information that affects future research and to find ways to improve the current methodologies of socioeconomic research, specifically with respect to methods of linking with other disciplines and using promising new resources.

Technology Introduction

The importance of the Technology Introduction subprogram is increasing as marketing concepts are integrated into the research process, beginning with the utilization of research results and proceeding to problem identification as the marketing concept is internalized. The goal of this subprogram is to meet clearly defined needs for well-defined groups by increasing the participation of both the clients (researchers) and the beneficiaries (rural poor) in a social marketing-based approach.

Two major areas of research will meet this goal. Initially, the major support will go to research on the process of introducing new technology into a community and evaluating the interaction

with various groups in the community. As knowledge and understanding of the process increase, the second area, which builds on previous experience but focuses on problem definition and research design, will be given increasing attention. Linkages with other IDRC programs and national research and development groups will be vital in developing this subprogram.

Resource Allocation in Agricultural Research

The goal of the third subprogram, Resource Allocation in Agricultural Research (RAAR), is to improve research management by focusing on resource allocation in the research process. Support will be provided to evaluate both the present allocation of resources in relation to needs and the use of current and future needs as the basis for deciding research priorities and resource requirements.

Project Selection Criteria

In selecting projects for support, the Agricultural Economics Program gives priority to those projects that fulfill seven criteria. These are projects that

- Are or will become an integral part of an institution's research program;
- Integrate social science research with research on generation and introduction of technology;
- Encourage the generation and transfer of technology;
- Consider both allocative efficiency and distributive justice in designing research;
- Promote the training and networking of scientists working in the same problem area;
- Employ a methodology that is likely to be used by national research groups in the future; and
- Have a planned end product that will give a realizable return to the poorer groups of the community.

Regional Programs

The Agricultural Economics Program supports projects that meet the national needs of the different regions according to their research capabilities. For this reason, program emphasis in Africa, where institutional and national priorities are developing, differs from the projects supported in Asia and Latin America, where more institutional requirements have been met and the major need is to support projects that will create desired change.

Africa

National governments in Africa and aid organizations are actively creating an agreed-upon development strategy for Africa. Through the Program, support will focus on building a core of African socioeconomists who can help set priorities and develop strategies to meet the needs of the poor.

A number of workshops, studies, surveys, and meetings of agricultural scientists held since 1980 have identified topics of major concern and provided guidelines that will be used by the Program to set priorities for its NRPUS subprogram.

In East Africa, the first priority will be NRPUS projects aimed at increasing the socioeconomic input in generating and introducing technology. The overall framework for this support will be networks that have a short-term component for training in economics.

Major donor organizations have only recently started to coordinate the emphasis and direction of their programs of support in West Africa. At times, the basic aim of furthering development appears to have been lost in confusion. Therefore, IDRC must continue to focus clearly on national needs and rural improvement, to support researchers of these countries to work in the important areas of rural development, and to ensure that they are in control of their own work.

The Agricultural Economics Program promotes interaction among scientists within a country and between countries to develop research objectives and strategies that meet the needs of rural communities. To achieve this, the NRPUS subprogram with three other IDRC divisions supports the Centre ivoirien de recherches économiques et sociales (CIRES) in Abidjan, Côte d'Ivoire. Its programs involve young agricultural economists in interdisciplinary research teams conducting research on rural problems. Most CIRES students are expected to return to their own countries to carry out their thesis work in projects supported by IDRC or other donors.

Asia

In East and Southeast Asia, the emphasis of both the NRPUS and Technology Introduction subprograms is on supporting scientists through networks that include a training component because most institutional requirements are already complete. Throughout the region, however, research is needed to encourage and support socioeconomists to become directly involved in biological and physical sciences that are needed to develop and disseminate new technology.

Those regional institutions that have an interdisciplinary orientation and are strong enough will be encouraged to help others through support directed to national programs. In the NRPUS sub-

program, this includes nondegree economics training for noneconomists and technical training for economists. In the Technology Introduction subprogram, marketing workshops have already been held in conjunction with other IDRC programs. In collaboration with the Information Sciences Division, building linkages and information systems between scientists will be a major activity in this region.

Both the NRPUS and Technology Introduction subprograms are increasing the level of socioeconomic research in fisheries and post-production systems research. Training programs in fisheries economics are supported at the University of Malaysia for scientists from Asia and Africa. This training activity is integrated into a fisheries research network that is also supported by the Agricultural Economics Program, other IDRC programs, and other donor agencies. Support is increasing for research to identify constraints and opportunities in a total food system for a region. Marketing concepts are being introduced to help analyze such systems under the Technology Introduction subprogram.

The activities of the RAAR subprogram focus on commodity studies, such as evaluating the potential returns of improving various characteristics of rice and organizational studies on the allocation of resources to different disciplines and institutions within a research organization.

Latin America

Agricultural economics capacity in Latin America ranges from practically none in some countries to very strong in others. A major task in this region is to help develop or improve several networks. Although the technical objectives of the networks vary, those supported by the NRPUS and Technology Introduction subprograms have two common characteristics.

They all promote a comprehensive research approach among biological, social, and extension scientists who are concerned with problems of farmers and are able to assist in solving them. The long-term goal of this approach is to make the agencies involved in research and extension more responsive to the needs of the farmers. To help achieve this objective, formal and nonformal training of members of multidisciplinary teams will receive high priority.

All networks also develop methodologies that contribute to research on production systems and allow the problem to be defined more efficiently and the parameters of the solution understood. In the NRPUS subprogram, multidisciplinary teams are working on improving methodologies to characterize environments where new technologies may be tested and parameters for extension developed. The major emphasis is to increase the level of economics research on crop and animal production systems. This includes economics training for economists and noneconomists, as

well as regional workshops to compare methodologies. Under the RAAR subprogram, different research and extension systems are evaluated to make the research process more efficient. Projects to link socioeconomists with research projects in forestry, post-production, and fisheries are being developed under the NRPUS and Technology Introduction subprograms.

Areas of Potential

In addition to programs designed to meet the needs of specific regions, the Agricultural Economics Program has identified topics of potential research to address its fundamental concern of access to food by all. These areas were selected by Program staff on the basis of consultations with knowledgeable, concerned people in developing countries, other donor agencies, and other IDRC divisions.

Although several important criteria and problems were identified, two related problems were given top priority.

The number of malnourished people in the world is increasing. Even more disturbing, most malnourished people are found in countries where average food consumption per person is increasing. This situation indicates that many people are not integrated into their society in a way that allows them to meet their basic needs.

Four areas of potential research that address the Program's concern with this situation were identified: rural poor, aquaculture, food losses, and firewood and shelterbelts.

Rural Poor

The plight of the rural poor is the major concern of the Agricultural Economics Program. In many countries, the rural poor consist largely of landless families who supply services to landowners, but for whom 40% of household income comes from "other activities." In addition, these other activities contribute a large portion of the income of farmers who cultivate less than 2 ha. Support will be given to national scientists to better understand these other activities and to develop approaches that will help the poor expand their contribution to their society and, in so doing, improve their own well-being.

To help the poor integrate more effectively into their economies, the Agricultural Economics Program will place increasing emphasis on building linkages between the poor, the researchers, the public and private services, and the market agencies.

Aquaculture

Aquaculture, now concentrated mainly in Asia and the Far East, has the potential to help meet the increasing need for protein of people in some developing countries and to provide them with

employment. Currently, 62% of all aquaculture research funding worldwide is spent in Asia, although investment has been increasing gradually in Africa and Latin America, where the humid regions are also suitable for aquaculture.

One aquaculture product with important potential is tilapia — the fish pond equivalent of chickens — because tilapia have low energy requirements for protein production. Although returns on investment can be increased with high levels of input and intensive management, tilapia can be produced with minimal input. Thus, this type of producion is suitable for farm families with limited cash.

Food Losses

Food losses, both in quality and quantity, between production and consumption are a serious concern. It is estimated that, each year, developing countries lose the equivalent of half of Africa's cereal production, or enough to feed 168 million people. Research to save and distribute food can not only cut food costs and increase the available food but also improve the stability to the food system.

Of particular concern are fish losses, which the Food and Agriculture Organization (FAO) of the United Nations ranked as the highest of all commodity losses in 1975. Because fish supplies 17% of the animal protein consumed in the developing world, finding economical ways to preserve this commodity is important.

Firewood and Shelterbelts

Research on firewood and shelterbelts could also improve access to food. Fuelwood requirements in developing countries were forecast to increase 86% in the 20-year period from 1980, resulting in a deficit of 1.1 billion m^3 by the year 2000. As firewood becomes less available, other easily accessible sources of fuel are used, often with deleterious effects on the food supply. Already, in South Asia, cow dung is more valuable as fuel than as fertilizer, with a resulting loss in soil fertility and potential food production. Equally, lack of a sustainable fuel supply leads to soil erosion because other combustible vegetation is used, thus baring the soil.

Other Programs of AFNS

Crop and Animal Production Systems

The overall objective of the Crop and Animal Production Systems (CAPS) Program is to support research on crop and livestock production with priority to research that will benefit small-scale farming families. Increased access by the poor to food and other basic necessities is given priority over research aimed at increasing agricultural productivity per se. Although there is a strong research bias toward increasing smallholder food production, other commodities are not neglected when they can make an Important contribution to alleviating rural poverty.

CAPS gives special attention to semi-arid tropical regions, which are home to many of the world's poorest people. These areas have also benefited the least from past achievements of agricultural research.

Projects supported by CAPS are often linked in networks in which the various participants are encouraged to interact to their mutual advantage. Scientists working on common problems meet regularly to exchange information and ideas.

CAPS attaches special importance to applied research that is likely to have a rapid effect at the farm level. More basic or strategic research is also needed, however, and many of the biological advances of recent years have much to offer the developing world. In such cases, scientists in developing countries may be linked, with advantage, to their counterparts in Canada to make use of the special expertise in Canadian institutions. Such cooperative projects account for about 20% of CAPS' current budget.

CAPS encourages a systems approach to research. In this approach, multidisciplinary teams of scientists work closely with the farming communities to help identify their actual problems and needs and to ensure that interventions designed to solve them are appropriate to the specific circumstances. Special attention is paid to the needs of disadvantaged groups such as the rural landless and women.

Research on cropping systems has been particularly successful in Asia where the increasing use of short-duration rice cultivars has opened a range of possibilities for increasing smallholder productivity. Similar research on cropping systems in Africa and Latin America is also starting to be effective.

Research on livestock emphasizes management, especially feeding systems, rather than animal breeding or diseases. Research on animal-production systems has been supported for several years in Latin America and is the focus of a regional network. Ruminants are given priority over nonruminants because they are better able to

utilize poor quality feed. Systems involving cattle, and to a smaller extent buffalo and camelids, are given highest priority. However, research on sheep and goat production is expanding in recognition of their value to the poorer livestock producers. Among the non-ruminants, small species such as rabbits, guinea pigs, ducks, poultry, and bees offer promising research opportunities that could benefit some of the world's poorest people and the landless.

Most small farms in developing countries are mixed; therefore, the interactions between crops and livestock must be understood in designing appropriate improvements. CAPS attaches special importance to research on such farming systems.

Crops provide about 80% of the total value of agricultural production. CAPS support of crops research focuses on a limited range of crops: in general, those that are not commonly studied but are important in the diets of and as source of income for the rural poor. In cereal research, CAPS has given a lower priority to the major cereals — wheat, maize, and rice — because of the major support from other donors and national governments and has concentrated on such species as sorghum and millet, which are staple crops for large numbers of people in semi-arid regions. In grain legumes, support has concentrated on cowpeas, groundnuts, and other tropical species in Africa and Asia, and on temperate pulses such as chick-peas, lentils, and faba beans in the Middle East and West Asia. Future funding will be increasingly allocated to such species as lathyrus and peas that do not have support from any international agricultural research centre.

Annual oilseed crops such as sesame, safflower, sunflower, rapeseed, mustard, linseed, and niger have also been neglected in the past, although vegetable oil is in short supply in many developing countries. CAPS focuses its support for research on these crops through a network of projects in eastern Africa and South Asia.

Support for root-crops research, especially cassava, has shifted away from Latin America and is now concentrated mainly in East and West Africa and Asia. Special attention is also given to the biological control of pests of cassava.

Perennial crops are important in many smallholder systems in the tropics and subtropics. CAPS support has gone mainly to banana and plantain, including funding to establish the International Network for the Improvement of Banana and Plantain. Coffee research is also of interest and other perennial crops for smallholders are expected to be supported in the future.

A small informal research network has been established with CAPS support for Andean crops such as quinoa, *kaniwa*, oca, and ullucu. Vegetables are gaining in importance because of their nutritional value and as source of income for smallholders with access to markets.

Research on increasing supplies of animal feed focuses on the

improvement of forage and pasture production, and the utilization of agricultural by-products. Pasture research is of particular importance in Latin America where CAPS supports a network of projects linked to the Centro Internacional de Agricultura Tropical (CIAT), and in Africa where another network, the Pasture Network for Eastern and Southern Africa, is coordinated by the International Livestock Centre for Africa (ILCA). By-product research is concentrated mainly in Africa and the Middle East. CAPS supports several national programs and the ILCA-coordinated African Research Network for Agricultural By-products, in these regions.

Rapidly expanding populations are increasing pressure on land and water resources in many parts of the world. In recognition of this, CAPS is giving greater attention to research on such important topics as fertilizers, soil erosion, tillage, soil-moisture conservation, and small-scale supplementary irrigation.

Fisheries

The primary objective of the Fisheries Program of AFNS is to support research on fish production that will benefit the poor. In the 1970s, it became apparent that most resources of wild fish were already exploited at near-maximum sustainable level. This situation has led the Fisheries Program to give priority to artisanal fisheries and aquaculture.

Artisanal fisheries employ some 20 million people worldwide and provide an important part of the total animal-protein supply in large areas of the developing world. Research problems include assessment of potential yields of natural stocks, efficient management systems to ensure that sustainable yields are not exceeded, and improved post-harvest techniques to bring maximum benefits from available resources to consumers.

Because artisanal fisheries vary in nature and importance from one region to another, research support is regionally flexible. Marine artisanal fisheries are emphasized in Latin America and the Caribbean whereas inland fisheries are a higher priority in Africa and the Middle East.

Aquaculture is a major area of support in Asia and requests for funding of artisanal fisheries research are limited. Research on reservoir fisheries can be supported in all regions because of its potential for increasing net fish production.

In Asia, the Fisheries Program gives high priority to improving existing aquaculture systems. In Africa and Latin America, where aquaculture is not a traditional practice, research to develop or adapt aquaculture systems for local conditions is a high priority. The Program seeks to promote the transfer of appropriate Asian aquaculture technologies by training African and Latin American students in Asia, encouraging exchange visits by Asian staff, and by joint research on-site wherever possible. Although the emphasis

is on producing food for poor populations, research into higher valued species and more intensive production methods may be justified when poor producers benefit.

Social and economic factors often hinder the spread of technically promising systems and the Fisheries Program supports research to overcome such constraints.

Forestry

During the past decade, the importance of forests and trees has been increasingly recognized in many developing and industrialized countries. However, expenditures on forestry research are small and mostly directed to the industrial sector, despite the fact that 80% of the wood harvested in developing countries is used for fuel.

The Forestry Program continues to emphasize integrated rather than industrial forestry and to reflect change in the research needs of the developing world, as well as change in the environment. The aim is to achieve a balanced mix of projects with emphasis on recipients who can be relied on to deliver and disseminate their research results.

Establishing growing trees is a top priority in the dry zones of Africa and South America, where expanding agriculture and the need for fuelwood have lead to destruction of the natural forests. Aside from the selection of the best-suited species, research support emphasizes the development of simple techniques to establish and manage woodlots with village-level implementation.

An interdisciplinary approach is taken in supporting agroforestry research, involving both the Crop and Animal Production Systems and Agricultural Economics programs. In the field of forest-product utilization, research has helped to determine and improve the functional properties of secondary and unknown timber species for their use in construction.

Research support for tree improvement and breeding concentrates on bamboo and rattan in Asia and on propagation methods and cultural techniques for widely used multipurpose species such as *Leucaena*, *Prosopis*, and *Paulownia*.

In the field of environmental forestry, the Program has supported a network of four research projects on shelterbelts in Africa to measure the effect of trees on the microclimate and the production of food crops.

Post-Production Systems

The Post-Production Systems Program deals with the technology, appropriateness, efficiency, and nutritional implications of post-harvest activities for the benefit of low-income people. It

covers a wide range of disciplines including engineering, biochemistry, entomology, nutrition, food science and technology, and economics and marketing.

The broad objectives of the Program are to make more and better food available to poor rural and urban consumers at the same time as augmenting employment and income. Food systems are the focus of the Program rather than specific commodities, technologies, or processes. Main activities are food processing and utilization; nutrition; food handling, drying, and storage; and equipment design, adaptation, and testing.

The Program also aims to strengthen village enterprises in the food and agricultural sectors. High priority is given to promoting and disseminating dehullers in rural milling systems, drying of staple foods and preserving perishable foods such as fish, fruits, roots, and vegetables. In all these sectors, training and institutional development are of considerable importance.

Of special concern to the Program is improving nutrition for low-income consumers, especially for such vulnerable groups as young children and pregnant and lactating women. Emphasis will continue to be on access to and supply of appropriate and acceptable foods for these groups. Close collaboration with the Health Sciences and Social Sciences divisions of IDRC on related activities is encouraged.

Head Office
IDRC, P.O. Box 8500, Ottawa, Ontario, Canada K1G 3H9

Regional Office for Southeast and East Asia
IDRC, Tanglin P.O. Box 101, Singapore 9124, Republic of Singapore

Regional Office for South Asia
IDRC, 11 Jor Bagh, New Delhi 110003, India

Regional Office for Eastern and Southern Africa
IDRC, P.O. Box 62084, Nairobi, Kenya

Regional Office for the Middle East and North Africa
IDRC/CRDI, P.O. Box 14 Orman, Giza, Cairo, Egypt

Regional Office for West and Central Africa
CRDI, B.P. 11007, CD Annexe, Dakar, Senegal

Regional Office for Latin America and the Caribbean
CIID, Apartado Aéreo 53016, Bogotá, D.E., Colombia

Please direct requests for information about IDRC and its activities to the IDRC office in your region.